Lloyd's Register

Rules and Regulations for the Classification of Ships, July 2009

Notice No. 7

Effective Date of Latest Amendments:

See page 1

Issue date: February 2010

RULES AND REGULATIONS FOR THE CLASSIFICATION OF SHIPS, *July 2009*

Notice No. 7

This Notice contains amendments within the following Sections of the *Rules and Regulations for the Classification of Ships, July 2009.* The amendments are effective on the dates shown:

Part	***Chapter***	***Section***	***Effective date***
1	1	5	1 March 2010
3	2	1	Corrigendum
3	5	1	Corrigendum
3	14	7	Corrigendum
3	16	7	Corrigendum
5	2	6	Corrigenda
5	7	3	Corrigendum
6	1	3	Corrigenda
7	16	1	Corrigendum
8	1	2	Corrigendum
8	2	5, 6, 10	Corrigenda

It will be noted that the amendments also include corrigenda, which are effective from the date of this Notice.

The *Rules and Regulations for the Classification of Ships, July 2009* are to be read in conjunction with this Notice No. 7. The status of the Rules is now:

Rules for Ships	Effective date:	July 2009
Notice No. 1	Effective dates:	1 January 2010 & Corrigenda
Notice No. 2	Effective dates:	1 January 2010 & Corrigenda
Notice No. 3	Effective dates:	1 January 2010 & Corrigendum
Notice No. 4	Effective dates:	1 January 2010 & Corrigenda
Notice No. 5	Effective dates:	1 July 2010 & Corrigenda
Notice No. 6	Effective dates:	1 July 2010
Notice No. 7	Effective dates:	1 March 2010 & Corrigenda

Part 1, Chapter 1
General Regulations

Effective date 1 March 2010

■ *Section 5*

5.1 LR has the power to adopt, and publish as deemed necessary, Rules relating to classification and has (in relation thereto) provided the following:

(a) Except in the case of a special directive by the Board, no new Regulation or alteration to any existing Regulation relating to classification or to class notations is to be applied to existing ships.

(b) Except in the case of a special directive by the Board, or where changes necessitated by mandatory implementation of International Conventions, Codes or Unified Requirements adopted by the International Association of Classification Societies are concerned, no new Rule or alteration in any existing Rule is to be applied compulsorily after the date on which the contract between the ship builder and shipowner for construction of the ship has been signed, nor within six months of its adoption. The date of 'contract for construction' of a ship is the date on which the contract to build the ship is signed between the prospective shipowner and the ship builder. This date and the construction number (i.e. hull numbers) of all the vessels included in the contract are to be declared by the party applying for the assignment of class to a newbuilding. The date of 'contract for construction' of a series of sister ships, including specified optional ships for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective shipowner and the ship builder. In this section a 'series of sister ships' is a series of ships built to the same approved plans for classification purposes, under a single contract for construction. The optional ships will be considered part of the same series of sister ships if the option is exercised not later than 1 year after the contract to build the series was signed. If a contract for construction is later amended to include additional ships or additional options, the date of 'contract for construction' for such ships is the date on which the amendment to the contract is signed between the prospective shipowner and the ship builder. The amendment to the contract is to be considered as a 'new contract'. If a contract for construction is amended to change the ship type, the date of 'contract for construction' of this modified vessel, or vessels, is the date on which the revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder. Where it is desired to use existing approved ship or machinery plans for a new contract, written application is to be made to LR. Sister ships may have minor design alterations provided that such alterations do not affect matters related to classification, or if the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the ship builder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to LR for approval.

(c) All reports of survey are to be made by surveyors authorised by members of the LR Group to survey and report (hereinafter referred to as 'the Surveyors') according to the form prescribed, and submitted for the consideration of the Classification Committee.

(d) Information contained in the reports of classification and statutory surveys will be made available to the relevant owner, National Administration, Port State Administration, P&I Club, hull underwriter and, if authorised in writing by that owner, to any other person or organisation.

(e) Notwithstanding the general duty of confidentiality owed by LR to its client in accordance with the LR Rules, LR clients hereby accept that, LR will participate in the IACS Early Warning System which requires each IACS member to provide its fellow IACS members and Associates with relevant technical information on serious hull structural and engineering systems failures, as defined in the IACS Early Warning System (but not including any drawings relating to the ship which may be the specific property of another party), to enable such useful information to be shared and utilised to facilitate the proper working of the IACS Early Warning System LR will provide its client with written details of such information upon sending the same to IACS Members and Associates.

(f) Information relating to the status of classification and statutory surveys and suspensions/withdrawals of class together with any associated conditions of class will be made available as required by applicable legislation or court order.

(g) A Classification Executive consisting of senior members of LR's Classification Department staff shall carry out whatever duties that may be within the function of the Classification Committee that the Classification Committee assigns to it.

Part 3, Chapter 2
Materials

CORRIGENDUM

■ *Section 1*
Materials of construction

1.3 Aluminium

(*Part only shown*)

Table 2.1.2 Minimum mechanical properties for aluminium alloys

NOTES
1. These alloys are not normally acceptable for application in direct contact with sea-water.
2. *See also* Table 8.1.3 or Table 8.1.4 in the Rules for Materials.
3. The mechanical properties to be used to determine scantlings in other types and grades of aluminium alloy manufactured to National or proprietary standards and specifications are to be individually agreed with LR, *see also* Ch 8,1.1.5 of the Rules for Materials.
4. Where detail structural analysis is carried out, 'Unwelded' stress values may be used away from heat affected zones and weld lines, *see also* 1.3.3.
5. For thickness less than 12,5 mm the minimum unwelded 0,2% proof stress is to be taken as 230 N/mm^2 and the minimum tensile strength is to be taken as 315 N/mm^2.

Part 3, Chapter 5
Fore End Structure

CORRIGENDUM

■ *Section 1*
General

1.5 Strengthening of bottom forward

(*Part only shown*)

Table 5.1.1 Additional strengthening of bottom forward (*see continuation*)

Item	Requirements
(2) Bottom longitudinals – other than flat bars	$\frac{d_w}{t_w} \leq 55\sqrt{k}$ $\frac{d_w t_w}{100} \geq 0{,}00033\, k\, h_s\, s\, c \left(S - \frac{s}{2000}\right)$ cm^2 $Z \geq 6{,}8 \times 10^{-6}\, h_s\, s\, k \left[(17{,}5 l_s)^2 - (0{,}01 s)^2 + d_w\, c \left(S - \frac{s}{2000}\right)\right]$ cm^3 ~~$\frac{(A_1 \tau + \alpha)}{p}$~~ $\frac{(A_1 \overline{\tau} + \alpha)}{p} \times 10^{-1} \geq 1$ $A_w \geq 0{,}84 A_1$

Part 3, Chapter 14
Cargo Securing Arrangements

CORRIGENDUM

■ *Section 7*
Container securing arrangements for stowage using cell guides

7.3 Mixed stacks of 20 ft and 40 ft containers

(*Part only shown*)

Table 14.7.3 Maximum container weights of ISO 1496-1:1990 20 ft containers stowed in 40 ft cell guides with overstow

Lowest tier Transverse acceleration (g)	Maximum container weights, in ~~tonnes~~ tons, *see* Note					
	3 Tiers	4 Tiers	5 Tiers	6 Tiers	7 Tiers	8 Tiers

Part 3, Chapter 16
ShipRight Procedures for the Design, Construction and Lifetime Care of Ships

CORRIGENDUM

■ *Section 7*
Protective coating in water ballast tanks

7.1 Protective Coating in Water Ballast Tanks – Descriptive note PCWBT

7.1.3 Recognised corrosion control coatings are listed in the *List of Paints, Resins, Reinforcements and Associated Materials*, which is published on LR's website, http://www.lr.org~~, and on the CD-Rom version of the *Rules and Regulations for the Classification of Ships* by LR~~. Guidance on coating condition is given in Chapter 1 of this List.

Part 5, Chapter 2
Oil Engines

CORRIGENDA

■ *Section 6*
Crankcase safety fitting

6.1 Relief valves

6.1.4 The valves are to be provided with a copy of the manufacturer's installation and maintenance manual for the ~~size~~ size and type of valve being supplied for installation on a particular engine. The manual is to contain the following information:

- Description of valve with details of function and design limits.
- Copy of type test certification.
- Installation instructions.
- Maintenance and in service instructions to include testing and renewal of any sealing arrangements.
- Actions required after a crankcase explosion.

6.1.7 The valves are to be provided with suitable markings that include the following information:

- Name and address of manufacturer.
- Designation and ~~size~~ size.
- Month/Year of manufacture.
- Approved installation orientation.

6.8 Oil mist detection

6.8.2 The oil mist detection system and arrangements are to be installed in accordance with the engine designer's and oil mist detection equipment manufacturer's instructions/recommendations. The following particulars are to be included in the instructions:

(a) ~~Schematic~~ A schematic layout of the engine oil mist detection and alarm system showing locations of engine crankcase sample points and cabling/piping arrangements together with pipe dimensions to the detector.
(b) Evidence of study to justify the selected locations of sample points and sample extraction rate (if applicable) in consideration of the crankcase arrangements and geometry and the predicted crankcase atmosphere where oil mist can accumulate.
(c) The manufacturer's maintenance and test manual.
(d) Information relating to type or in-service testing of the engine with engine protection system test arrangements having approved types of oil mist detection equipment.

Part 5, Chapter 7
Propellers

CORRIGENDUM

■ *Section 3*
Design

3.2 Keyless propellers

(*Part only shown*)

3.2.1 The symbols used in 3.2.2 (oil injection method of fitting) and 3.2.3 to 3.2.7 (dry fitting cast iron sleeve) are defined as follows:

I_f = percentage increase for Ice Class 1D, obtained from ~~Ch 9,3.2.1~~ Table 2.5.1 in Pt 8, Ch 2,5

Part 6, Chapter 1
Control Engineering Systems

CORRIGENDA

■ *Section 3* Control and supervision of unattended machinery

3.2 Oil engines for propulsion purposes

(*Part only shown*)

Table 1.3.1(a) Oil engines for propulsion purposes: Alarms and slowdowns (*conclusion*)

Item	Alarm	Note
Feed water or water/thermal fluid forced circulation flow (if fitted)	Low	*See* Pt 5, Ch 14,6.2.7 and ~~Note 7~~ Note 8
Uptake temperature	High	To monitor for soot fires. *See* ~~Notes 7 and 8~~ Notes 8 and 9
NOTES ~~7~~ 8. Alarm only required when an exhaust gas economiser/boiler/ thermal oil heater is fitted. ~~8~~ 9. Alternatively, details of an appropriate fire detection system are to be submitted for consideration.		

3.9 Auxiliary engines and auxiliary steam turbines

(*Part only shown*)

Table 1.3.8 Auxiliary engines and auxiliary steam turbines: Alarms and safeguards (*Part only shown*)

Item	Alarm	Note
OIL ENGINES		
Exhaust gas temperature (for engines >500 kW/cylinder)	High	Per cylinder. ~~For engine power <500 kW/cylinder, common sensors for each inlet to the turbo-charger may be accepted~~

Part 7, Chapter 16
Requirements for Machinery and Engineering Systems of Unconventional Design

CORRIGENDUM

■ *Section 1* Requirements for machinery and engineering systems of unconventional design

1.2 Information to be submitted

1.2.4 Project process documentation including:
(a) Project Management Plan, *see* 1.3.
(b) Requirements Definition Document, *see* 1.4.
(c) Quality Assurance Plan, *see* 1.5.
(d) Design Definition Document, *see* 1.6.
(e) Risk Management Plan, *see* 1.7.
(f) Configuration Management Plan, *see* 1.8.
(g) Verification Plan, *see* ~~1.7~~ 1.9.
(h) Integration Plan, *see* 1.10.
(j) Validation Plan (certification and survey), *see* 1.11.

Part 8, Chapter 1
Application

CORRIGENDUM

The Notation was incorectly shown in Notice 4.

■ *Section 2*
Ice environment

2.4 Ice Class notations

2.4.2 In general, an **Ice Class** Notation contained in this Part of the Rules will only be assigned where the vessel has been assigned a ~~[⊠]~~ **⊠LMC** notation. A **[⊠]LMC** notation may be accepted where ice class machinery items are not included within the scope of the propulsion arrangements for acceptance of a manufacturer's certificate, *see* Pt 1, Ch 1.

Part 8, Chapter 2
Ice Operations – Ice Class

CORRIGENDA

■ *Section 5*
Machinery requirements for light ice conditions – Ice Classes 1D and 1E

5.4 Minimum propeller blade tip thickness

5.4.1 The tip thickness, t, of the blade at 95 per cent radius is to be not less than that obtained by the following formula:

$$t = 0{,}14\,(T + 57)\sqrt[3]{\frac{430}{\sigma_u}} \quad \text{mm}$$

where

T = blade root thickness required by ~~5.2.1~~ 5.3.1, in mm

σ_u = specified minimum tensile strength of material, in N/mm^2.

■ *Section 6*
Hull requirements for first-year ice conditions – Ice Classes 1AS FS, 1A FS, 1B FS, 1C FS and 1D

6.4 Stem

6.4.2 The section modulus of the stem in the fore and aft direction is not to be less than determined in accordance with the following formula:

$$Z = 1500\,(\alpha_O\,\gamma^2)^{3/2} \quad \text{cm}^3$$

where

α_O = longitudinal distribution factor for the forward region as given in Table 2.6.2

γ = is defined in ~~6.6.2~~ 6.3.1.

6.4.5 Where in the ice belt region the radius of the stem or bulb front plating is large, one or more vertical stiffeners are to be fitted in order to meet the section modulus requirement of ~~6.7.2~~ 6.4.2. In addition, vertical ring stiffening will be required for the bulb.

6.6 Rudder and steering arrangements

6.6.2 For double plate rudders, the minimum thickness of plating and horizontal and vertical webs in the main ice belt zone is to be determined as for shell plating in the aft region. For the horizontal and vertical webs, the corrosion-abrasion increment, ~~c,~~ need not be added. For **Ice Class 1D**, the minimum thickness of plating and webs, of double plate rudders and the extent of application are to be determined as for those in **Ice Class 1C FS**.

■ *Section 10*
Hull strengthening requirements for navigation in multi-year ice conditions – Ice Classes PC1, PC2, PC3, PC4, PC5, PC6 and PC7

10.5 Hull areas other than the bow

(*Part only shown*)

10.5.1 In the hull areas other than the bow, the force, F_{NB}, and line load, Q_{NB}, used in the determination of the load patch dimensions, b_{NB}, w_{NB}, and design pressure, P_a, are determined as follows:

(a) Force, F_{NB}:

$$F_{NB} = 0{,}36 C_C \Delta_F \quad \text{MN}$$

where

C_C = crushing force class factor from Table 2.10.1

Δ_F = ship displacement factor

= $\Delta^{0,64}$ if $\Delta \le C_{DI}$

= ~~CF_{DIS}~~ $C_{DI}^{0,64} + 0{,}10 (\Delta - C_{DI})$ if $\Delta > C_{DI}$

Δ = ship displacement, in kilo tonnes, not to be taken less than 10

C_{DI} = displacement class factor from Table 2.10.1

10.9 Shell plate requirements

(*Part only shown*)

Table 2.10.4 Shell plate thickness

Symbols
σ_y = minimum upper yield stress of the material, in N/mm^2
b = height of design load patch, in m, where $b \le I - \frac{s}{4}$ in the case of transversely framed plating

10.10 Framing – General

(*Part only shown*)

10.10.7 The actual net effective shear area, A_w, of a framing member is given by:

$$A_w = \frac{h\, t_{wn} \sin\varphi_w}{100} \quad \text{~~cm^2~~ cm}^2$$

10.10.9 When the cross-sectional area of the local frame exceeds the cross-sectional area of the attached plate flange, the plastic neutral axis is located a distance z_{na} above the attached shell plate, given by:

$$z_{na} = \frac{100\, A_{fn} + h_w\, t_{wn} - 1000 t_{pn}\, s}{2 t_{wn}} \quad \text{mm}$$

and the net effective plastic section modulus, Z_p, is given by:

$$Z_p = t_{pn}\, s\, z_{na} \sin\varphi_w + \left(\frac{((h_w - z_{na})^2 + z_{na}^2)\, t_{wn} \sin\varphi_w}{2000} + \frac{A_{fn}\, ((h_{fc} - z_{na}) \sin\varphi_w - b_w \cos\varphi_w)}{10} \right) \quad \text{cm}^3$$

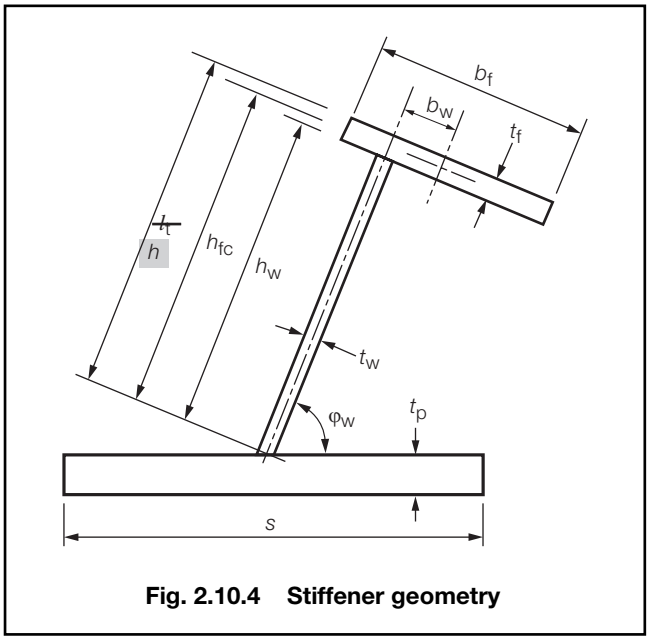

Fig. 2.10.4 Stiffener geometry

10.12 Framing – Side longitudinals (longitudinally framed ships)

(*Part only shown*)

10.12.2 The actual net effective shear area of the frame, A_w, as defined in 10.10.7, is to comply with the following condition:

where

$$A_L = \frac{5000\, AF\, K_s\, P_a\, b_1\, a}{0{,}577 \sigma_y} \quad \text{cm}^2$$

AF = hull area factor from Table 2.10.3

K_s = peak pressure factor from Table 2.10.2

P_a = average pressure within load patch according to 10.7.1, in MPa

~~B_1~~ b_1 = $k_o\, b_2$ m

$$k_o = 1 - \frac{0{,}3}{b'}$$

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